

SECTION 16XXX: SAMPLE SPECIFICATION, FOR THE PHOENIX WATER

HEATER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section describes gas fired, high efficiency, condensing water heater for domestic hot water heating.

B. Related Sections include the following: Division 15 Section “Breechings, Chimneys, and Stacks”. However, the flue venting material shall be PVC, schedule 40, per ANSI/ASTM D1785. CPVC solid core pipe is also acceptable. Foam Core Pipe is not acceptable.

1.3 SUBMITTALS

A. Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories for each model indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, and method of field assembly, components, and location and size of each field connection.

C. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer installed and field installed wiring.

C. Source Quality Control Tests and Inspection Reports: Indicate and interpret test results for compliance with performance requirements before shipping.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

E. Maintenance Data: Include in the maintenance manuals specified in Division 1. Include parts list, maintenance guide, and wiring diagrams for each heater.

1.4 QUALITY ASSURANCE

A. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

1. Water heaters shall be UL/ULC listed and meet or exceed thermal efficiency and standby loss requirements of current ASHRAE standards. Heaters shall exceed the minimum efficiency requirements of ASHRAE 90.1b-1992. All water heaters shall approved in accordance with ANZI Z21.10.3. and be supplied with AGA/ASME rated temperature and pressure relief valve. The pressure vessel shall be certified for a 150 psi maximum working pressure.

2. Water heater controls panel shall be an integrated solid state temperature and ignition control device with integral diagnostics. It shall meet all safety and construction requirements of ANSI Z21.10.3

B. Comply with NFPA 70 for electrical components and installation.

1.5 COORDINATION

A. Coordinate size and location of concrete bases. Concrete, reinforcement, and seismic requirements are specified in Division 3 Section "Cast-in-Place Concrete."

1.6 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. Installing contractor shall provide one year of warranty parts and labor. Manufacturer shall provide 1 year parts on the components and 3 years on the stainless steel tank.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Manufacturer shall be a company specializing in manufacturing the products specified in this section. Subject to compliance with requirements, manufacturers offering water heaters that may be incorporated into the Work include, but are not limited to, the following:

B. Burner Design: Heaters shall be UL listed design, certified as a condensing water heater. Ignition shall be with direct spark, with ignition taking place at a pre-set ignitions speed for the burner blower. In addition the heaters shall be designed for a minimum of 3:1 continuous turn down with constant CO₂ over the turndown range. The boiler shall operate with natural gas or propane and have a certified input rating as noted on the drawings, and a thermal efficiency rating of 96%. The heater will automatically adjust input for altitude and temperature induced changes in air density. The burner is Low NOx emissions design. Meets SCAQMD Rule 1146.2

C. Service Access/Clearances: Units shall be serviced from the front. The heater as well as all related intake air and exhaust intake air and exhaust gas piping shall be approved for zero clearance to any combustible surface.

D. Water Heater Controls: The heater control shall utilize an algorithm to fully adjust the burner modulating firing rate while maintaining the desired temperature. The pre-mix stainless steel burner uses a 120 volt motor with pulse wave (VFD) modulation control to change the fan speed in concert with the gas valve, thus the combustion volume of fuel and air mixture, throughout the burner modulation range, is constant. This provides for constant, ideal combustion efficiency. Heater shall have an LED fault display capability and a digital display of temperature settings for establishing set point, temperature differential. The digital LED control display shall provide means, via push buttons, for adjustments of operating temperatures, differential adjustment, ECO reset, service mode, and real time status mode. In addition, there shall be provided a computer connection via laptop computer for perpetual history, which includes all fault codes, and hours of operation above 50% of input, below 50% on input as well as real time status reporting of all operations. The burner assembly shall be mounted so as to be easily removed as a integral unit for easy serviceability.

E. Venting: The heater shall be designed for vertical or sidewall venting. Combustion air can be ducted, or drawn from the equipment room using conventional air louvers per local and national code requirements. The heater's total combined equivalent venting length, including fitting allowances for both the intake air and exhaust gas shall provide performance of up to 85' and standard vent sizes. This distance can increase by increasing diameter.

F. Manufacturers: Shall be Heat Transfer Products, Phoenix Series. As distributed by Hydronic Specialties Company, (800)786-6847. Pre-approved equals will be considered, subject to compliance with requirements and all design specifications found herein..

2.2 COMPONENTS

A. Combustion Chamber: The combustion chamber shall be constructed of minimum 16-gauge stainless steel. Aluminum or galvanized steel is not acceptable. An access door shall be provided for ease of service and inspection of the heat exchanger.

B. Heat Exchanger: Shall be constructed of corrosion-resistant, 90/10 cupronickel and stainless steel.

C. Heater tank: Shall be constructed of 316L stainless steel. The tank insulation shall be 2" thick of non-CFC polyurethane foam insulation, rated R-17. All water connection nipples shall be constructed of stainless steel and be located on the side of the tank. The top and bottom of the tank shall be smooth with no pipe tappings or supports. Heat loss is less than _ deg./hr. The jacket shall be of high impact plastic which eliminates dents and rust.

D. Safety Devices: Heater(s) shall be provided with the following safety controls: Blocked flue, high flue temperature, low water cut-off, High Limit safety, Flame failure, ignition failure, and Temperature & Pressure Relief Valve.

2.3 TRIM AND ACCESSORIES

Heater manufacturer shall provide the following (shipped loose):

A. PVC Vent termination coupling for exterior termination of vent pipe.

B. PVC Tee termination for combustion air.

C. Surge protector, to protect heater electronics from power surges.

D. Acid neutralizer kit(s), to be installed by contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

Examine area to receive heater(s) for compliance with requirements for installation tolerances and other conditions affecting heater performance. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install heater(s) level and plumb, according to manufacturer's written instructions and referenced standards.
- B. Support heater(s) on 4 inch (100 mm) thick concrete base, 4 inches (100 mm) larger on each side than base of unit.
- C. Install electrical devices furnished with boiler, but not specified to be factory mounted.
- D. Install a full port ball valve on the City Water Makeup line, just before connection to the heater. This affords tank drainage and flushing.
- E. Run condensate piping, through neutralizer to drain. Must be within 10 feet of heater(s).

3.3 CONNECTIONS

- A. Connect gas piping full size to boiler gas train inlet with union.
- B. Connect hot water piping to supply heater tapings with shutoff valve and union or flange at each connection.
- C. Install piping from safety relief valves to nearest floor drain.
- D. Electrical: Comply with applicable requirements in Division 16 Sections. This should include a dedicate electrical circuit to the heater(s)
- E. Ground equipment. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory authorized service representative to supervise the field assembly of components and installation of boilers, including piping and electrical connections. Report results in writing.
- B. Manufacturer's representative shall supply a factory authorized service technician to start up the heater and make combustion analysis and adjustments.
- C. Engage a factory authorized service representative to train Owner's maintenance personnel as specified below:
 - 1. Operate heater, including accessories and controls, to demonstrate compliance with requirements.
 - 2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
 - 3. Review data in the maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
 - 4. Schedule training with Owner with at least 7 days advance notice.

END OF SECTION 16XXX